DOCUMENT RESUME

ED 210 023 IR 009 829

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TITLE Academic Computing at Jackson State University. A Case Study.
INSTITUTION Human Resources Research Organization, Alexandria, Va.
SPONS AGENCY National Science Foundation, Washington, D.C. Minority Institutions Science Improvement Program.
PUB DATE 80
GRANT SER-7914601
NOTE 60p.: For related document, see ED 208 931.

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Colleges; *Computer Oriented Programs; Computer Programs; *Computer Science Education; Higher Education; Input Output Devices; Liberal Arts; *Minority Groups; Organization; Outcomes of Education; Outreach Programs; Profiles
IDENTIFIERS *Computer Centers; Computer Literacy; *Jackson State University MS

ABSTRACT

Prepared by the Human Resources Research Organization to assist administrators, faculty, staff, and students at other minority institutions, to plan, extend, or improve uses of computers, this case study is one of a series on educational applications of computers. A profile of Jackson State University identifies the location, programs, mission, numbers of faculty and students, tuition and financial aid, accreditation, and the budget, and a chronology of significant events leading to the present state of academic computing is provided. An explanation of the functional organization and management of the central academic computing and support, including organization charts, is followed by (1) discussions of policies, hardware, software, and courses which facilitate students' use of computers; (2) courses and requirements for both undergraduate and graduate students in the computer science program; (3) a list of departments requiring majors to take computer science courses; (4) a description of the leadership role of Jackson State University in regional networks and workshops; and (5) advice from Jesse C. Lewis, director of the computer center, on how other similar institutions can apply the computing experience of Jackson State. The appendix includes the procedures for selecting the case institutions, a 9-item bibliography, and individuals to contact. (RBF)

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Academic Computing at Jackson State University

A Case Study

Beverly Hunter

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Foreword

This book was prepared by the Human Resources Research Organization and supported by the National Science Foundation, Grant Number SER-7914601. Beverly Hunter is Principal Investigator. Any opinions, findings and conclusions are those of the author and do not necessarily reflect the views of the National Science Foundation.

Ms. Barbara Straka of the Jackson State University Computer Center gathered the information on academic computing that is described in this book. Dr. Jesse Lewis, Director of the Computer Center, provided guidance to both Ms. Straka and the author.

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Purpose

This book is one in a series of Case Studies of Academic Computing. The Case Studies focus on the ways in which computers have come to be an everyday tool and companion to students and teachers for the purpose of learning and teaching. The Case Studies are addressed to administrators, teachers, staff and students who wish to plan, extend, or improve the academic uses of computers at their own institutions. You should find the Case Studies helpful in performing one or more of the following kinds of activities.

1. *Assessing the extent and nature of instructional computing at your own institution, by comparison with the Case Institutions.*

We selected a range of different sizes and kinds of institutions so that you could find one that most closely resembles your own. Case Institutions include secondary schools, public school districts, community colleges, colleges, and universities in most regions of the continental United States.

2. *Organizing and staffing your computer center to provide improved support for instructional computing activities.*

The Case Studies highlight those aspects of organization and staffing that appear to be most significant in encouraging beneficial uses of computers for learning and teaching.

3. *Making computer resources more accessible to students.*

The Case Studies identify policies, procedures, documentation, hardware, software, and courses that facilitate student use of computing.

The sections on Student Accomplishments provide ideas as to the kinds of achievements students attained with the aid of computers.

4. *Extending computer applications in particular courses and disciplines.*

Information is available in Case Books and from the contact persons listed at the back of the book concerning the kinds of computer applications used in the various academic disciplines and courses.

5. *Raising the general level of computer literacy on campus.*

The section on Computer Literacy describes goals and programs aimed at educating students and faculty regarding computer uses and the impact of computers on society.

6. *Establishing or improving a computer science curriculum.*

Most of the Case Institutions have a formal program designed to train students in computer science and/or data processing.

7. *Sharing your facilities, expertise, or curricular materials with your community or other institutions.*

The section on Outreach describes the ways the Case Institution makes an impact on the world around it with regard to instructional computing.

8. *Preparing a Five Year Plan for academic computing at your institution.*

The organization of the Case Books might be a useful framework for presenting your own Five Year Plan. Also, most of the Case Institutions have their own Plans from which you may draw ideas.

Profile

Jackson State University is a coeducational urban institution supported by the State of Mississippi. It is controlled by the Board of Trustees of Institutions of Higher Learning. Financial support is provided by legislative appropriations, supplemented by student fees and federal and private grants.

LOCATION

Jackson State was founded at Natchez, Mississippi in 1877 as a private church school controlled by the American Baptist Home Mission Society. The institution moved to Jackson in 1882 and to its present 120 acre site in 1902.

PROGRAMS

In 1940 the institution was designated as a State Teachers College by an act of the Mississippi State Legislature. In 1942, a four-year program leading to the Bachelor of Science in Education was initiated. The school continued to expand and in 1953 the Division of Graduate Studies was established. Under the administration of Dr. John A. Peoples, the sixth and current president, the academic program has continued to expand and now consists of five schools: Liberal Studies, Education, Business and Economics, Industrial and Technical Studies, and Graduate Studies.

MISSION

Dr. Peoples has brought to the students and faculty a greater self-awareness and a new spirit of freedom, symbolized by the school motto: "You shall know the truth and the truth shall make you free." In 1974, by executive order of the Governor, Jackson State College became Jackson State University.

The mission of the University is "to provide for the higher education of persons from all walks of life; but in particular, persons from deprived circumstances." In the educational process the University seeks "to

develop persons who can and will assume salient roles in the dynamics of societal growth and change." The University seeks to attain its mission by providing a broad spectrum of courses, facilities and talented faculty.

FACULTY

During the 1979-80 academic year, the instructional faculty numbered 423, with 14% full, 20% associate, 34% assistant professors, 18% instructors, and 14% other faculty. Over 52% of this faculty holds doctoral degrees from 241 different institutions.

STUDENTS

Student enrollment was over 7,800 students in 1979. There has been an increase of over 250% since 1966 when enrollment was 2,300. Of particular note is the growth in the Graduate School from 132 students in 1966 to more than 1,167 in 1979. In 1979, there were 1,062 total degrees awarded of which 718 were undergraduate and 344 graduate. The University offers 54 different undergraduate degrees, 34 Masters level and 12 Specialist in Education degrees. In 1979-80 the Board of Trustees approved a Doctorate in Education degree program.

Ninety percent of the students are Mississippi residents and approximately 50% of these come from within a 50-mile radius of the University. The out-of-state residents include a variety of foreign students. About 72% of the undergraduates attend the University on a full-time basis, whereas only 6% of the graduates are full-time students. In 1979, women represented 57% of the student population. Jackson State's history has been that of a black institution, but today 20% of the students are non-black. The faculty is also well distributed with 35% being non-black.

Jackson State University students are primarily first-generation college, low-income individuals from Mississippi. Of 1,143 freshmen students responding to an American Council on Education Survey in 1977, only 25.4% reported having family incomes of $8,000 or more. Twenty-three percent reported family incomes less than $3,000.

Students at Jackson State are increasingly career-oriented. Business management, industrial technology, computer science, and public affairs majors have increased rapidly over the past five years, while the social sciences, education and humanities have declined in majors enrollment.

TUITION AND FINANCIAL AID

During the 1977-78 academic year, the admission standards were raised, but it has had only a small effect on the ever-increasing enrollment. Because the institution is part of the Statewide System of Higher Education, it has been able to keep student expenses to a minimum. In 1979, undergraduate tuition was $350 per semester for Mississippi residents and $412.50 per semester for non-residents.

An extensive financial aid program awards about $9 million annually to deserving students. Approximately 84% of the students enrolled receive some form of financial aid, either scholarships, grants, loans or work-study.

ACCREDITATION

The University is accredited by the Southern Association of Colleges and Schools, National Council for the Accreditation of Teacher Education and other professional organizations for respective programs and departments of the University.

BUDGET

The educational and general budget of the University was $18,820,572 for 1979-80.

Two Decades of Computing

Academic computing at Jackson State University has a dynamic history beginning in the early 1960's. The Mathematics Department offered the first course in computer science in 1962. Management and leadership of academic computing continued through the Mathematics Department until the Computer Science Department was established in 1968.

Prior to 1973, academic computing at Jackson State University developed independently of other institutions within the State. In 1973, Jackson State University became the central site for a Regional Educational Computing Network for Colleges in central Mississippi.

The following chronology highlights significant events that have led to the present state of academic computing at Jackson State University.

1960: First computer hardware installed. IBM 407 Accounting Machine. Used primarily for administrative purposes.

1962: First course in Computer Science offered by the Mathematics Department.

First stored program computer installed: IBM 1620 Computing System was installed in a computer laboratory in Just Hall of Science under the direction of the Mathematics Department. The laboratory was used for instructional and research purposes.

1966: Dr. Jesse C. Lewis, leader in promotion of computers at Jackson State University, returned after a leave of absence for study and was named Professor and Department Head.

First Title III Grant was awarded by the Department of Health Education and Welfare (HEW) for University Development.

1968: Computer Science Program established under the direction of Mathematics Department. Five students enrolled in the program.

Major hardware improvements occurred in both academic and administrative areas. An IBM 1130 was installed in the computer laboratory in Just Hall of Science and an IBM 360/20 was installed in the Administrative Data Processing Center in Dansby Hall. A staff of two was added to serve in a technical and academic capacity. The academic computer center was in the hands of a director and two student personnel. All interested students had access to the system.

Major Software Advance: The IBM 1130 Computing System had a FORTRAN IV compiler available, the first higher level language available for use in the academic program.

1972: Department of Computer Science established within the Division of Natural Sciences in the School of Liberal Studies. An undergraduate program was created which gives students a general education including 39 semester hours in computer science.

Major hardware improvement, an IBM 360/40 Computing System was installed for academic and administrative work. The system included a CPU with 384K memory, 6 IBM 2319 Disk Drives and I/O devices.

Computing Center established to provide support services to academic and administrative components. The merger of the academic and administrative computer centers allowed the University to establish efficient, economically viable services. Dr. Jesse C. Lewis assumed directorship of the Center as well as Chairmanship of the Computer Science Department.

Visiting Professor, Dr. V.J. Asher of IBM, joined the Computer Science faculty for three years and aided in development of Computer Science Programs.

1973: Regional Educational Computing Network for Colleges of Central Mississippi was established under a five-year grant from the National Science Foundation (NSF). Jackson State served as the central site and lead institution, providing remote computing services and promoting curriculum development. Jackson State was awarded $340,400 and the other 11 participating institutions received $101,265. With contributions, including services and equipment from the participating institutions, the value of the project was $1,263,722.

Staffing increases: Three joint Computer Science Department and Computing Center positions were created under the NSF Network grant. In addition, a full-time machine operator was hired. Under a Title III Grant from HEW, a Systems Analyst

was added to the staff for administrative applications. In all, six technical staff plus the director made up the Computing Center staff.

Hardware expansion: An IBM 2702 Communication Controller and 20 Texas Instrument terminals were added to the IBM 360/40 System to support the Network.

Software enhancements brought in as a result of the Educational Network included intereactive languages, BASIC and PL/1, and a Common Library of application programs. The Library included Business Analysis/Basic Package; Economic analysis programs; Math/Basic Package; Stat/Basic Package; Chemistry, Physics and Simulation programs; and Game/Mind Teaser programs. This software was supported by the time-sharing system, ITF (Interactive Terminal Facility) which ran in conjunction with DOS on the IBM 360/40 system. The DOS system supported FORTRAN IV, COBOL, and RPG.

NSF Grant in the College Science Improvement Program provided time-sharing terminals and curriculum consultants for the Mathematics Department.

1974 Jackson State College became Jackson State University.

Network activities and developments included expansion to 19 participating institutions; addition of more interactive terminals at both local and remote sites; replacement of IBM 2702 with an IBM 3705 Communications Controller; and utilization of In-WATS system for communication with institutions outside Jackson. The first formal Network Workshop was conducted.

Seminar on the NSF Network was given at the Conference on Curriculum Change in Black Colleges VIII, in Daytona Beach, Florida. A portable terminal was used to demonstrate the system.

Master of Science: Graduate program in Computer Science was authorized by the Board of Trustees of Institutions of Higher Learning. The program emphasizes the areas of management science, information systems, analysis and design, and statistics.

Computing Center moved to its present location in the Classroom Complex building.

Advanced Institutional Development Program (AIDP) Grant for over two million dollars total was awarded the University by the Department of Health Education and Welfare (HEW). The Administrative Improvement Component of the grant provided some funds to the Computing Center for support personnel and equipment. One systems analyst was added to the staff and two programmers were added the following year.

1975: Second Network Workshop conducted for participating institution personnel.

Visiting Professor: Ms. Lynne Bracker of IBM joined the Computer Science Department for one year.

Computing Center joined CAUSE (College and University Systems Exchange), and GUIDE (IBM user group).

1976: Major hardware change: IBM 370/145 with 3/4 megabytes of memory, six CDC 3330 disk drives and two IBM 4310 tape drives replaced the IBM 360/40 mainframe and IBM 2319 disks.

Software enhanced: The IBM 370/145 operated under control of Virtual Machine software which supports both time-sharing (MUSIC and CMS) and batch (DOS) systems. The MUSIC (McGill University System for Interactive Computing) enhanced the facilities available to the Network users. Language support expanded to include FORTRAN IV G&F, ANS COBOL, PL/1 (Optimizer), BASIC, APL, ASSEMBLER, and RPGII. Packages changed to support MUSIC STATPAK, MUSIC/SCRIPT and COGO.

Demonstration of Network capabilities and computer systems was given at the Third Conference on Educational Computing in Minority Institutions (ECMI), New Orleans, Louisiana. Thirteen interactive terminals and one remote batch station were used to give the participants hands-on experience.

Computing Center expanded to twelve full-time technical staff members and reorganized along functional lines.

1977: Computer Science Department hosted National Science Foundation Regional Research Conference on Numerical Analysis, October 10-14, 1977, under the direction of Dr. Ram P. Chakrabarty, Associate Professor of Computer Science.

Computer Science Department hosted Mid-South Association of Educational Data Systems Conference under the direction of Conference Chairman, Dr. Jesse C. Lewis, Chairman of Computer Science Department, Chairman of the Division of Natural Sciences and Director of the Computing Center.

Grant received from the National Science Foundation Minority Institutions Science Improvement Program to increase computer applications in social science curricula.

Software additions: VS BASIC, WATFIV (University of Waterloo FORTRAN Compiler); PL/C (Cornell University PL/1 Processor); SPSS (Statistical Package for the Social Sciences); GPSS (General Purpose Simulation System); BMDP (University of California Biomedical Statistical Package); Huntington II CAI Package.

1978: First on-line interactive library system, a circulation control system for the University's Henry Thomas Sampson Library, was implemented under CICS (Customer Information Control System). The system uses an IBM Optical Scanner attached onto an IBM 3277 Display Station to read bar-coded labels affixed to student, faculty, and staff ID cards and the circulated books. The information is used to update library data bases on the IBM 370/145. Funds from a supplemental AIDP grant from HEW were used to support the hardware and software costs.

A Second AIDP (Advanced Institutional Development Program, now SIDP, Strengthening Development Institutions Program) grant was awarded to the University by the U.S. Office of Education. The grant's main objective is to institute a Competency-Based/General Education activity. In support of this activity, the Computing Center expands terminal facilities, provides additional CAI software and training.

Software additions: History, English, and economics CAI from Notre Dame installed.

1979: Established Cooperative Computer Science Programs with Lane College; a four-year institution in Jackson, Tennessee, and Meridian Junior College in Meridian, Mississippi. Under these

arrangements, students will complete the last two years of their studies at Jackson State University.

Computing Center invited to be a member of Southeastern Regional Conference of Computer Centers.

Microcomputer laboratory for mathematics instruction is initiated by the Mathematics Department.

Graphics. Tektronix PLOT-10 software system installed under the MUSIC timesharing system to support a Tektronix 4662 Interactive Digital Plotter attached serially to Texas Instrument interactive terminal in the Chemistry Department.

Mini-Course Series began consisting of week-long intensive studies of various areas of computer science.

1980: Major hardware change: IBM 370/155 with CDC 3330 dual density disk drives installed. Approximately 20 CRT terminals to be added to the system.

Software enhancements: CAI software packages for mathematics and English to be installed for interactive use.

Workshop on Educational Computing for MISIP Computer Equipment grantees planned.

Organization and Management

Central facilities and support for academic computing are managed by the Jackson State University Computing Center (JSUCC). The Director of the JSUCC reports to the Vice President of Academic Affairs. The JSUCC is responsible for administrative, as well as instructional and research applications of computing.

Originally, the Academic Computing Center was staffed by a Director and two student personnel. In 1972, the Administrative Data Processing Center and the Academic Computing Center were combined under the control of the Director of the Computing Center. The combining of academic and administrative computing in one Computer Center has been the most economic and efficient approach for Jackson State.

The present management structure of JSUCC evolved to satisfy particular requirements of the wide variety of users it serves. One primary objective is to provide computer services to the Jackson State University students, administrators, faculty, and staff. A second major function is to provide computing services to other educational institutions, both institutions of higher learning and secondary schools, continuing the services initially provided under the NSF Regional Education Network grant.

In order to fulfill these commitments, the JSUCC is divided into six major functional areas. These are administrative data processing, operations, systems development, system programming, educational network and faculty and staff research and development.

FUNCTIONAL ORGANIZATION

Each functional area is directed by a manager.

1. The Manager of Administrative Data Processing coordinates execution of administrative applications, sets up schedules and confers with computing center staff and administrators on enhancements and additions to administrative systems. A staff of keypunchers, a data clerk, and a financial analyst support these functions.

2. The Operations Manager oversees scheduling and control of all data processing equipment. The scheduling effort includes maintenance, system programming and testing, administrative production and development jobs, student batch, and interactive work and research jobs. A

full-time operator and part-time student workers make up the staff. All Computer Science majors are encouraged to become involved.

3. The System Programming Manager is responsible for overall system operating environment with the aim of providing optimum performance. This responsibility includes installing new software, tuning the system, analyzing hardware and software needs, providing technical assistance and developing standards and guidelines for system software and machine utilization.

4. The Systems Development Manager coordinates assessment of new or revised application needs, feasibility studies, procedures for system design, operation and documentation. The major emphasis is on the development of administrative applications.

5. The Manager of User Services manages the Regional Educational Network and provides support for faculty and staff research and development work. Network support includes satisfying user requests, providing user education, assigning accounts, installing application packages, monitoring system performance, and backing up the system. An effort has been made to continue and expand the services provided under the NSF Regional Educational Network grant. The major emphasis in supporting research has been identifying resources, consulting, coordinating requests for computer resources and procedures for graduate research and analyzing feasibility of installing various kinds of software.

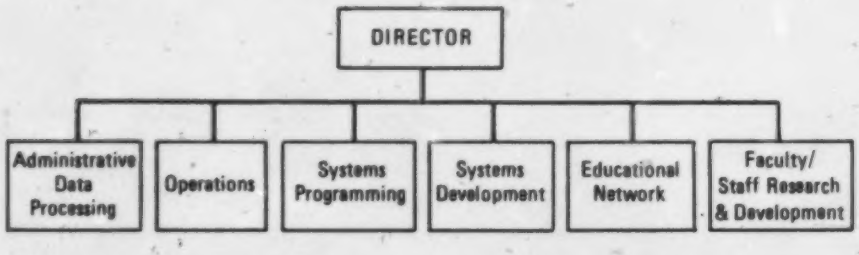

Figure 1 – **General Organizational Structure of Jackson State University Computing Center**

STAFFING

Expansion of the staff has been largely supported through the NSF Regional Education Network grant and Advanced Institutional Development Program (AIDP) grants. The 1980 technical staff includes five managers, three system analysts, two programmers, systems programmer, operator, financial analysts, data clerk, and various student operators and programmers.

ADVISORY COMMITTEE

An advisory committee consisting of faculty representatives help steer the direction of academic computing at Jackson State University. The committee is responsible for recommendations on development of computer-based instruction, long-range plans, and resolution of computer usage conflicts or problems. At least one member of this committee feels that this committee should have a stronger voice in setting policy for the computer center.

COST SAVING PURCHASE PROCEDURES

Acquisition of computer equipment and software for JSUCC is controlled by the State government. All significant requests must be justified to and approved by the University administration, the Board of Trustees and the Central Data Processing Authority (CDPA). The aim of this process is to save State funds by reducing computer costs.

The State agency, CDPA, was created to attain this goal. The main function of CDPA is to supply computer services needed by the State agencies and to approve and purchase computer equipment and software for State agencies and institutions. CDPA has cut computer expenditures for the State by fulfilling State agency needs through a central powerful computer center and by transferring equipment between institutions as requirements dictate. This procedure occasionally has the side-effects of slowing or changing implementation plans of the University.

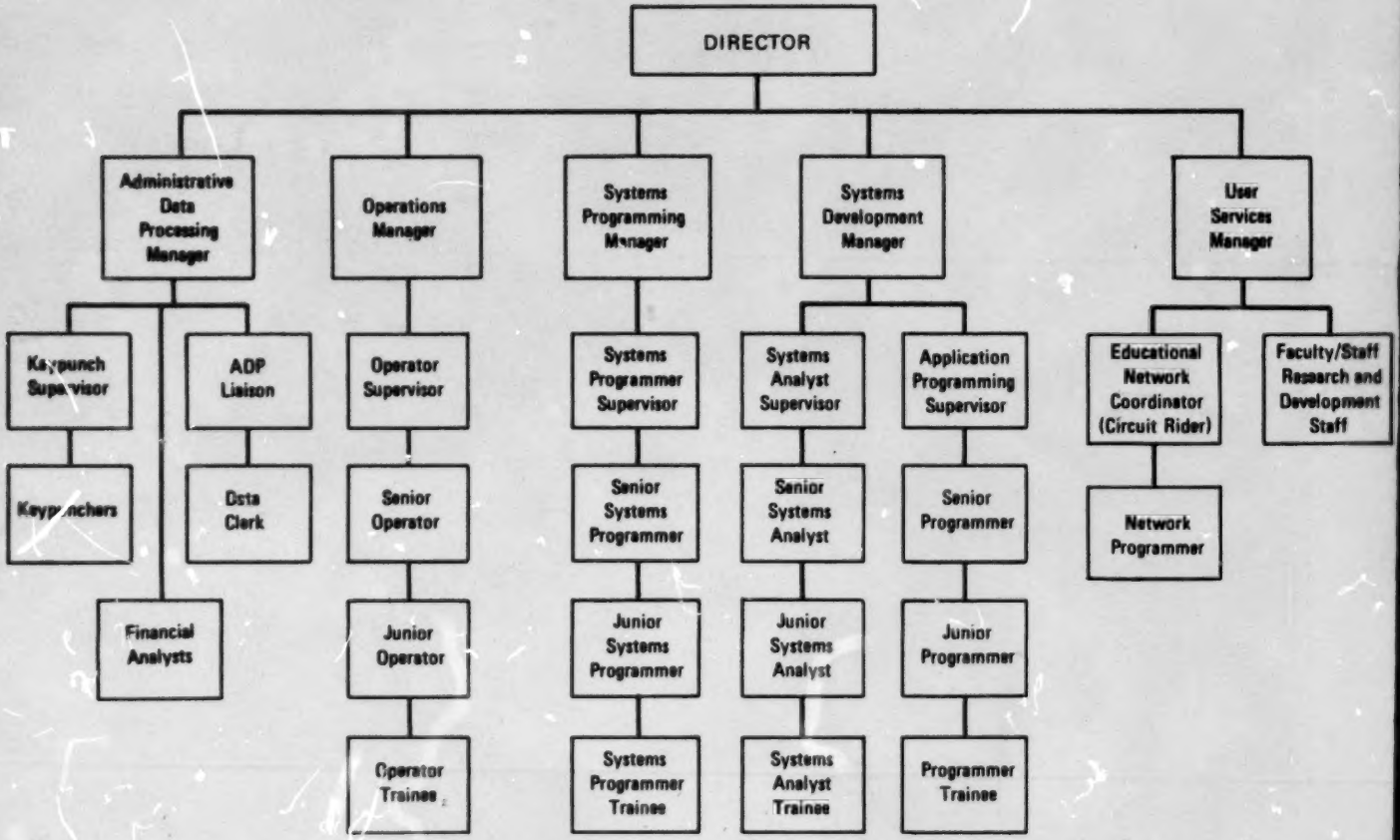

Figure 2 – Jackson State University Computing Center Organizational Structure

While purchase of terminal equipment is coordinated centrally, maintenance of the equipment is the responsibility of individual Departments housing the terminals. According to JSUCC staff, overall cost savings probably could be realized if maintenance were also coordinated centrally.

COSTS AND BUDGETS

The expansion of equipment and services for computing is reflected in the increases in budgets over the years. The budget for computing was about $20,000 in 1967-68. Twelve years later (1979-80), it was about $665,000. This latter figures includes salaries for computer science faculty and computer center staff, contractual services, and computing equipment for both administrative and academic computing.

Access to Computer Resources

This chapter describes the resources that enable students and faculty to use computing in their teaching, learning and research activities. A student or faculty member's access to computing is influenced not only by the type and amount of computing equipment available, but also by the policies on user access, priority given to instructional uses, the availability of appropriate software for their applications, documentation to help the user, and availability of technical assistance.

Computers available to students and faculty at Jackson State include the central computer at Jackson State University Computer Center (JSUCC), mini- and microcomputers owned by academic departments, and computers at other universities and research centers.

ACCESS POLICIES AND PRIORITIES

JSUCC facilities and services are shared by administrative and academic users. Access to the central computer is allocated according to a priority scheme. The Network terminals, both on and off campus, are first priority followed by the on-line Library Circulation System, production administrative applications, student jobs and, lastly, development and research jobs. A recent academic computing survey indicated adequate service in the areas of turnaround and software support.

The JSUCC has an open-access policy for central computer timesharing and batch systems. Any Jackson State University student, faculty or staff member may use the computer facilities as often and as much as desired, as long as other users' access and service is not degraded. Compliance with the terminal reservation system (sign-up and hour time limit) is mandatory during peak usage times. Access to tapes and disk space is provided on a limited basis. Private tapes may be used as long as the tapes are registered for identification and handling purposes with the JSUCC Operations staff.

No account numbers are required for use of the batch system. For the timesharing system, faculty and staff may request an individual account identification code (user ID) or use the open student account. Services are free. However, faculty doing research are encouraged to include funds for computer services in their grant budgets.

Access by off-campus users is controlled by each individual network participant.

CENTRAL COMPUTER

The JSUCC has one of the largest computer facilities in the State. A schematic of the IBM 370 configuration is shown in Figure 3. The central processor is an IBM 370 Model 155, with four million bytes of CDC memory.

TERMINALS

The JSUCC Regional Education Network Time-Sharing System supports about 30 interactive terminals for student and faculty use. Twelve terminals are located at remote sites at the network participating institutions. These terminals use an In-WATS system to communicate with the central site, which has proved more reliable and cost-effective than leased lines.

The remaining terminals are placed on the Jackson State University campus at the following locations:

Academic Skills Center
Terminal Room of the Computing Center
Sociology Laboratory
General Science—Meterology Laboratory
Chemistry Department
Mathematics Department
Physics Department
Political Science Department
Social Science Laboratory
Special Education Department
Bureau of Business and Economic Research
Computer Science Department

The terminals include Texas Instrument Silent 700 KSR and ASR Model 733; Bell Dataspeed 40; GE terminet; Lear Siegler; ADDS with TI 810 printer; Hazeltine 1400; and a Digi-Log Telecomputer. The portable Digi-Log Telecomputer can be connected to a video display unit for use in classroom demonstrations and lectures.

Despite the continual increase in number of terminals since 1974, terminal access has not kept pace with need. In order for a faculty member to require computer use by all students in a class, he/she must be

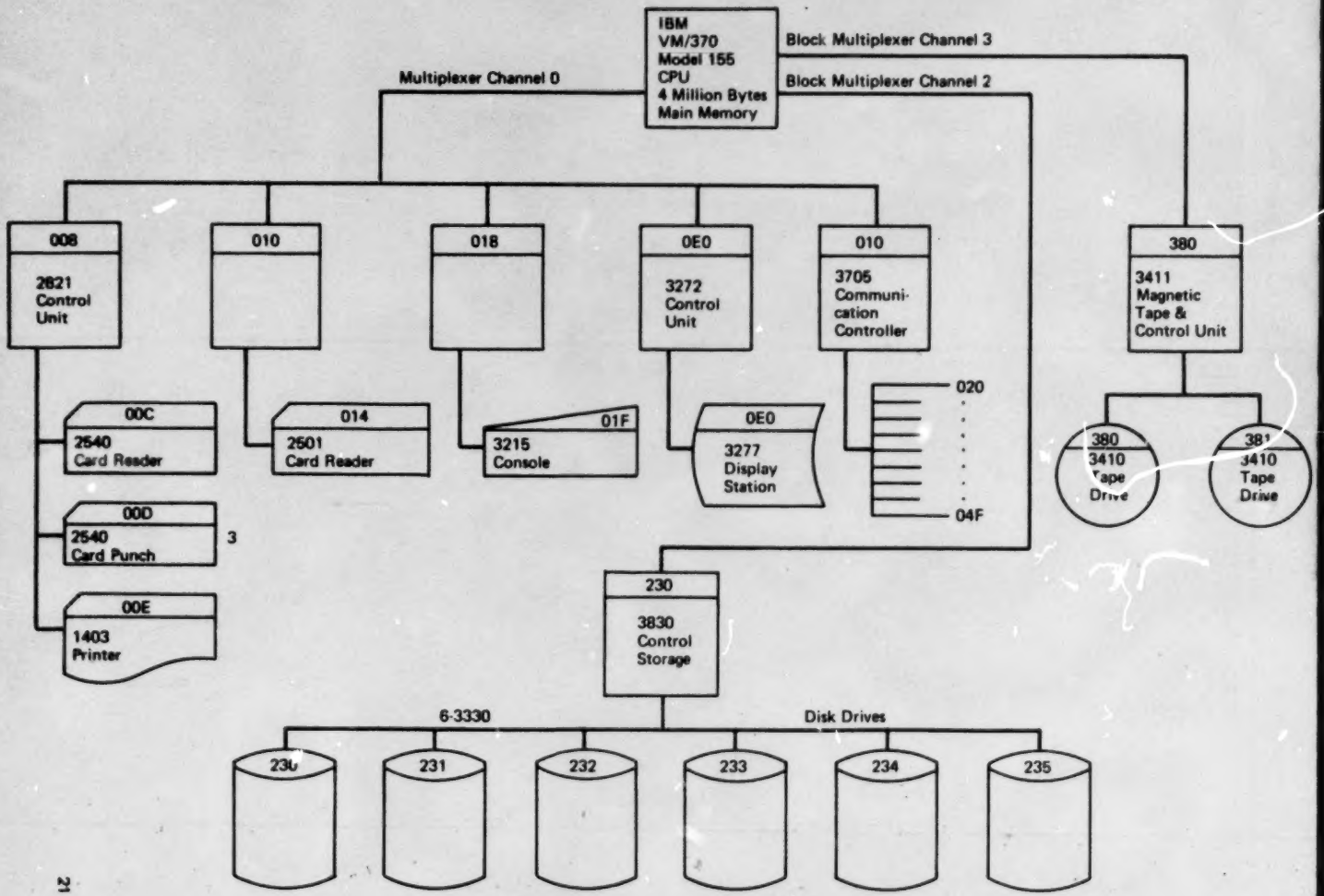

Figure 3 – JSUCC VM/370 System Configuration

assured that all students will have access to a terminal. This is not possible where hundreds of students are competing for access to a few terminals. In order to satisfy currently perceived needs for instruction and research applications, JSU would need one terminal and/or microcomputer for every 50 students, i.e., about 160 terminals.

Terminal Room at JSUCC

GRAPHICS

There is a growing demand for graphics hardware and software. At present, a Tektronix 4662 Interactive Digital Plotter is attached serially through a Texas Instrument Silent 700 to the timesharing system. A Tektronix 4051 stand-alone desk-top computer to be added in 1980.

SOFTWARE

The Virtual Machine software of the IBM 370 makes it possible to serve the diverse users and applications simultaneously. Separate partitions are dedicated to administrative and to academic users.

The JSUCC provides both batch and timesharing services to academic users. One of the two DOS/VS systems running under control of IBM's Virtual Machine software (VM/370) on the central computer is dedicated to student and faculty jobs. Batch jobs are submitted to the system directly through a dispatch window in the Computing Center or remotely through the timesharing system.

The McGill University System for Interactive Computing (MUSIC) is the timesharing system used to support the Regional Education Network. By combining multiple languages and interactive capabilities, MUSIC has proven to be particularly suitable for the educational environment due to its ease of use. MUSIC operates in a virtual machine under VM/370 and takes advantage of many of the Control Program functions, thereby reducing the total system overhead.

The development philosophy of MUSIC was to be able to service non-programmers. The command language was designed with ease of use as a key criterion. No Job Control Language is involved in using the system. The command language for both interactive and batch processing is conversational and English language oriented. Even when a user needs to input jobs through a card reader, he need not use Job Control Language. With this capability available to student users, a large number of student batch jobs run under MUSIC which reduces the total load on the production batch (DOS/VS) virtual machine.

The DOS/VS batch and MUSIC timesharing systems support the following language processors:

FORTRAN IV F	BASIC
FORTRAN IV G1	VS BASIC
WATFIV	APL
ANSCOBOL	ASSEMBLER
PL/1 OPTIMIZER	RPG II
PL/C	ASSIST

A variety of application packages are available:

Statistical Package for the Social Sciences (SPSS)

SPSS is an integrated system of computer programs used for analysis of social science data. The system enables the user to perform different types of data analysis in a simple and convenient manner. SPSS allows a great deal of flexibility in the format of data. It provides procedures for data transformation and file manipulation, and it offers the researcher a large number of statistical routines commonly used in the social sciences.

Biomedical Computer Programs (BMDP)

The UCLA Biomedical Computer Programs are a series of programs in the general category of description and tabulation, multivariate analysis, regression analysis, time-series analysis, variance analysis and special programs.

General Purpose Simulation System (GPSS)

GPSS is a tool for modeling and examining the behavior of systems in the engineering and management science areas. Many applications of a complex logical and procedure-oriented nature which ordinarily defy mathematical description can be easily described and studied using GPSS. Varying environments may be introduced to enable the user to explore alternatives and identify capacity limitations. Both environment and activities may have random variations. Proposed changes to existing policies, methods, and operations can be subjected to critical performance criteria and evaluated. The user may also investigate and judge the value of new proposals without costly capital investments and without disturbing existing operations.

MUSIC/STATPAK

STATPAK, a statistical package containing a total of 23 statistical analyses and data modifications routines, allows the user to interact with the computer to analyze data. Designed so that users with little or no previous computer experience can utilize the analyses available, STATPAK is conversational. Data may be entered from the terminal or from previously saved MUSIC Save Library files and, in either case, the user is prompted for data and other pertinent information as it is required.

MUSIC/SCRIPT

This set of text processing application programs allows secretarial, administrative and programming personnel to prepare, store and produce final documents ready for mailing or publication. It is particularly useful for the preparation of letters or technical or legal documents that must be letter-perfect or are subject to constant revision.

COGO

MUSIC/COGO is an implementation of the Civil Engineering Coordinate Geometry program (COGO).

POLYSOLVE

This program is a powerful conversational tool that can be used as a "desk calculator," a demonstration program, and an equation solver.

MUSIC FORTRAN Checkout Subsystem (MUSIC/FCS)

This subsystem provides MUSIC FORTRAN users with a source level checkout facility at execution time. Commands can be entered dynamically from a terminal to monitor, trace and alter the flow of a program while it is running. Program execution can be halted, the current values of the variables examined and changed.

Huntington II Computer Simulation Programs

These programs were developed by the Huntington Two Computer Project, and published by the Digital Equipment Corporation. These simulation programs were designed to be used to enrich secondary school curricula in physics, biology and social studies. Huntington Two simulations provide opportunity for learning by student participation and observation.

Tektronix—PLOT-10 Software System

This system contains the basic building blocks for graphics operations of all sophistication levels and many kinds of computer environments.

Game Access System

This system allows you to run the games and demonstrations.

General

The network offers a variety of program library services in BASIC, PL/1, FORTRAN, COBOL and ASSEMBLY. The services are available in batch as well as conversational mode. Programs are available in most disciplines.

Computer-Assisted Instruction (CAI)

The JSU [illegible]C seeks to acquire suitable CAI courseware developed at other institutions, rather than undertake development of such materials at JSU. CAI materials in English, economics, history and mathematics have been acquired from Notre Dame University and from CONDUIT (based at the University of Iowa).

AVAILABILITY

The batch system is available 6am - 10pm weekdays, and 8am - 12 noon Saturday. The timesharing schedule is normally the same; however, it is generally available on a 24-hour basis and is taken down only for preventive maintenance. Batch turnaround time varies directly with the system workload. Usually, batch users receive one hour turnaround until the end of the academic semester when demand is highest and turnaround time increases.

Suggested changes to the system are analyzed by the Computing Center staff with input from faculty. Recommendations are then justified to the University administration, Board of Trustees and the State's Central Data Processing Authority for final approval.

USAGE

There are over 2000 on-campus users of the JSUCC facility, and an undetermined number at network institutions.

Statistics on computer usage are not made available on a regular basis. During 15 days of February 1980, a typical month in mid-semester, there were 959 interactive sessions on the open student account. This represents 487.9 connect hours. Records are not available for batch jobs.

CONSULTING AND RELATED SERVICES

A User Clinic provides consultation to users while classes are in session during the Fall and Spring semesters. The clinic is located in the JSUCC open-card preparation work area. Upper division students and graduate students staff the clinic on both a paid work-study and volunteer basis. When student consultants are not on duty or are unable to provide the necessary guidance or answer the technical questions, the user is referred to the Manager of User Services.

The structure of the clinic's service changes from time to time. However it is designed around the following activities:

- Answer questions that will clarify documentation, error messages, and JSUCC procedures.
- Help users in their use of computing facilities by directing them to documentation, manuals, books, seminars, other people, etc.
- Inform JSUCC of problem areas so that action may be taken to correct, document, or otherwise improve general user interface with the system.

In addition to the consulting service, User Services supports instructional and research programs by maintaining and installing software, conducting mini-courses on proper use of computing resources, providing technical documents and information notices and installing and making minor repairs to terminals.

DOCUMENTATION

Technical documentation is available at the JSUCC User Clinic. Important announcements are sent to users and displayed on JSUCC bulletin boards and on the timesharing message facility. A User Orientation Guide is scheduled for distribution campus-wide.

DEPARTMENTAL COMPUTERS

In addition to the central computer system, several other computers on campus are owned by individual departments. Among these are:

- Computer Science Department—six microprocessors donated by Bell Laboratories.
- Mathematics Department—PET personal computer used in the Math Laboratory; several others are on order.
- Geography—an Apple personal computer is planned for grant research work.
- School of Industrial Technology—a microcomputer is planned for course work.
- Mass Communications—a Compugraphic mini-computer system for copy editing and document creation is used in a laboratory.
- Chemistry—PDP/8 and NICOLET computers are used for laboratory work.

ACCESS TO EXTERNAL COMPUTERS

Academic users of computing require access to specialized resources such as special data banks, software packages, or application programs. Sometimes it is most cost-effective to obtain these services from a distant computer center, rather than to provide for all needs at one university center.

One such special resource used at Jackson State is the PLATO network, whose computer is located at the University of Illinois. The Jackson State Chemistry Department has used PLATO to supplement instruction in General Chemistry.

Members of the Physics Department use computer facilities at such laboratories as Los Alamos Scientific Laboratory, Lincoln Laboratory, and Lawrence Berkeley Laboratory. Such laboratories often can provide software and programs needed for scientific research that the JSUCC does not have staff to support.

Spectrum of Applications

Students and faculty from about twenty academic departments use computer applications for coursework and research. The spectrum of applications includes computer-assisted tutorials and drills, testing, laboratory data reduction and analysis, modeling and simulations, statistical analysis, copy editing and typesetting, accounting, information retrieval, programming, and a variety of problem-solving applications.

At the time of this writing, several departments are planning new and expanded applications of the computer for instruction and research, and are seeking additional equipment and software.

Examples of present and planned applications are described in the following sections.

ACCOUNTING

The Department of Accounting offers two courses in which students use the computer. These are Accounting Information Systems and Advanced Accounting Application to EDP. Enrollment in these courses is about 12 undergraduates and 50 graduate students per semester.

Accounting majors are required to take two introductory computer courses, Digital Computer Principles and Introduction to Computers and Programming.

BUSINESS EDUCATION AND ADMINISTRATIVE SERVICES

Computer orientation and use is required in the following courses:

Office Appliances — A basic simplified computer program is used to demonstrate the capabilities of the computer to perform routine tasks. Students are acquainted with the operation and use of the IBM keypunch machine.

Research in Business Education — A tour of the computer center is arranged to introduce students to the types of computer equipment available for any who desire to use the facilities for research projects.

Independent Study and Research — Students are encouraged to use the computer to summarize and analyze data when appropriate for research projects.

All undergraduate departmental majors are required to take Introduction to Computers and Programming. This represents approximately 75 students annually.

In addition, all undergraduate office administration majors are required to take Digital Computer Principles. This represents approximately 40 students annually.

CHEMISTRY

Research projects involve direct use of the computer not only by the faculty, but also by their graduate and undergraduate assistants. A project in molecular model building involves statistical data manipulation and fitting a theoretical model to the observed data. A project involving calculation of theoretical line shapes uses a digital plotter connected to the central computer.

Individualized instruction for students in general chemistry and organic chemistry has been provided through the PLATO system. JSU faculty developed courses on PLATO for each of four chemistry courses taught at JSU—two semesters of General Chemistry, Principles of Chemistry, and Organic Chemistry. The courses were developed using the catalog of lessons available on PLATO. Two graphic display terminals connected to the PLATO computer at University of Illinois are used to supplement regular instruction in these undergraduate courses. About 150 students used the PLATO lessons in the 1978-79 academic year. Pilot evaluations show an increase in test scores on the American Chemical Society chemistry test for students using the system on a regular basis, as compared with students in previous years (Wodetzki, 1979).

Expansion of the PLATO instruction project was recommended by the Chemistry Department coordinator; however, the additional terminals needed to expand the program have not yet been obtained.

ECONOMICS

All undergraduate economic majors are required to take three computer-related courses, provided by the Computer Science Department and the Finance and General Business Department.

As a part of the grant project supported by the Minority Institutions Science Improvement Program of the National Science Foundation, computer applications were incorporated into three economics courses: Consumer Economics, Money and Banking, and Economics Seminar (McLemore, 1979).

ENGLISH

About 1000 freshmen students attend courses in Communications Skills and Composition, and a large proportion of these students need remedial work, as indicated by entry scores on standardized examinations. A grant from the Strengthening Developing Institutions Program (previously AIDP) is supporting a major effort to provide computer-assisted instruction for these students. All freshmen whose ACT scores upon entry are 14 or below, are assigned by the Communication Skills Center to use CAI tutorials in English.

Computer-assisted instruction tutorials in English are currently available on the JSU timesharing computer. These tutorials were developed at Notre Dame and include a wide variety of review routines.

FINANCIAL AND GENERAL BUSINESS

Finance majors are required to take at least two computer courses. One of these, Introduction to Computers and Programming, is offered by the Finance and General Business Department. The other course is provided by the Computer Science Department. About 200 finance and general business students per semester take the Introduction to Computers and Programming course.

The Department also offers a Computer Applications course which is required for all graduate students. This course uses the STATPAK, and efforts are now underway to obtain the SAS statistical package which is more suitable for economic modeling.

A number of graduate students use the computer facilities in their research. For example, work on "U.S. Direct Investment: Case Study of India" required use of the SPSS software package for regression analysis.

Another project, "Specification and Estimation of an Econometric Model to Forecast the Level of Non-agricultural Employment in the State of Mississippi," also made extensive use of JSU computer software for data management and regression analysis. Most software has been imported from other institutions, but some has been developed by the faculty.

GENERAL SCIENCE

In the course, Research Methods in Meteorology, students are required to write programs in FORTRAN and BASIC, and to use interactive statistical analysis programs. One project in this course involves accuracy checking of digitized data. Pairs of students are assigned a chart upon which meteorological field variables are analyzed. The students digitize the data; input the data to the computer; use the STATPAK statistical package to calculate average and standard deviations for the variables; and write FORTRAN programs to plot the data on grids and perform other calculations on the data.

In Physical and Dynamic Climatology, students use the computer to solve statistical problems.

In General Meteorology, students receive extra credit for writing programs to solve homework problems.

Meteorology majors are required to take computer science courses as a part of their program of studies.

Research projects using the central computer include work in climatological analysis, atmospheric modeling, and graduate student thesis research. Students participate in research projects involving weather prediction and analysis of weather maps.

GEOGRAPHY

The Geography Program has received grant funds from NASA to purchase a microcomputer with graphics, digital image processing, and image display capabilities. This equipment will be used for research and instruction. In research, this equipment will process multispectral digital data from NASA LANDSTAT satellites. In instruction, the equipment will

be used to train students in Advanced Remote Sensing Techniques courses whereby they will be trained to process remotely sensed multispectral digital data. Courses to carry out this training include Aerial Photo Interpretation, Remote Sensing Principles, and Computer Cartography.

HISTORY

Computer-managed tutorials for a two-semester introductory course in Western Civilization, and a one-semester introductory course in early American history are used by students in history courses. These tutorials, developed at Notre Dame, include 75 tutorial programs which contain over 800 questions. When a student answers a question, he/she is provided with information explaining why the answer is correct, partially correct, or incorrect.

At least one faculty member has used these tutorials with great success. The individualized pace and competency-based format are two features that are particularly appreciated. In one semester, 300 students were introduced to the use of these tutorials. However, more terminals will be needed in order to provide adequate access to the programs for all students.

LIBRARY SCIENCE

In the course, Introduction to Information Science, students keypunch and run programs written in FORTRAN and COBOL provided by the Instructor. Students are given demonstrations and/or use the DIALOG online bibliographic data bases using the terminal in the H.T. Sampson Library.

In the course, Cataloging & Classification, students use the SOLINET/OCLC cataloging subsystem using terminals available in the Jackson Metropolitan Library.

In the course, Information Storage and Retrieval, students use time-sharing system using terminals, run the BASIC game package and sample programs provided by the instructor. Students also use the DIALOG online bibliographic data bases.

In Library Automation, students write simple programs in FORTRAN, punch and execute in the batch mode and timesharing mode.

In Simulation & Games in Education students use the BASIC games package.

In Bibliography of the Sciences and Technology students use the on-line bibliographic and numeric data bases in science and technology, DIALOG and BRS systems.

In Advanced Cataloging & Classification students use the SOLINET/OCLC Cataloging Subsystem, Interlibrary Loan Subsystem, and Serials Control Subsystem.

In Library Research & Research in Educational Media students use the SPSS package to analyze data for their case studies and projects.

MARKETING

The course, Principles of Marketing, is a required course for all of the approximately 2000 students in the College of Business and Economics. Presently, the testing procedures for this course are being computerized.

Marketing Research is a project-oriented course. Students form consulting companies, develop research objectives, perform secondary data searches, develop and distribute questionnaires, code the questionnaire data on computer cards, develop SPSS programs to analyze the data, interpret computer output, and write reports of the results. This course is required for graduation from all marketing majors (about 200).

Managerial Marketing is a required course for more than 250 MBA students. A computer simulation game is used in every classroom session. Students form companies, choose products, and make decisions on numerous marketing related variables. The program provides each team of students with a balance sheet, an income statement, summary of industry's operation, research results, and so forth. Several rounds of the game are played during the semester.

Research applications in the department include Computer Assisted Organizational Diagnosis, Study of Black Submarket Consumption Behavior, and American Expatriates' Adjustment Problems in Foreign Cultures.

MASS COMMUNICATIONS

The Department has a Compugraphic minicomputer system including a typesetter that is used in a student laboratory. Courses using the system include Principles and Practices of Reporting, Copy Editing, and Newspaper Production. The classes work together using the system to produce a newspaper. In this way, students learn current techniques used in the industry and are able to practice these skills.

MATHEMATICS

The mathematics faculty have used the central computer in their research, and have developed a few programs for use by students in solving problems. Computer graphics are used by faculty to prepare sequences of slides that illustrate various mathematical methods and functions. Examples include a sequence illustrating a Monte Carlo method for computing an estimation of the value of pi, and sequences that help students visualize the graphs of polynomial functions.

Two major efforts are currently underway to provide computer-assisted instruction to underclass students, especially those needing remedial work. Several microcomputers have been ordered for a methematics laboratory that will use software developed at Sheridan College in Ontario, Canada. The software provides testing, diagnosis of student deficiencies, and tutoring in college algebra and other undergraduate subjects. This effort is being supported by a Kenan Foundation grant to purchase equipment.

Computer-assisted instruction is also provided for freshmen whose ACT scores upon entry to JSU are 14 or below. This effort is part of the grant from the Strengthening Developing Institutions Program (previously called the AIDP program). Computer-based mathematics drills are used by these freshmen as part of a special program administered by the Communications Skills Center.

PHYSICS

The Physics Department at JSU is small but has been growing rapidly over the past five years. Members of the department have made extensive

use of computers at other facilities such as Los Alamos Scientific Laboratory, Lincoln Laboratory, Lawrence Livermore Laboratory, and Fermi Laboratory. These specialized laboratories have been able to provide facilities that the JSUCC computer center was not staffed to provide.

Students are also able to use these facilities through their participation in summer programs at these national laboratories.

Pending placement of terminals in the department and development of graphics software, a variety of computer applications to learning and teaching are planned. Computer-assisted instruction uses in the basic and general physics courses are planned, as well as uses of circuit analysis programs in undergraduate classes.

Enhanced graphics and other software will enable faculty to perform more of their research on the JSUCC computer. These research areas include astrophysics, energy studies, computer studies of solution properties, and electrical properties of ionic solids.

POLITICAL SCIENCE AND SOCIOLOGY

In 1977-1979, the Division of Social Science upgraded the instructional program with the aid of a grant from the National Science Foundation Minority Institutions Science Improvement Program. The objectives of this project included providing "new and innovative scientific techniques in the science so that Jackson State University's students will be able to compete with others in the areas of research methodology and computer technology, and to produce students with the necessary quantitative and methodological skills to successfully compete in graduate school." (McLemore, 1979)

As a result of these and other efforts, computer-based techniques have been introduced into several political science and sociology courses, including Seminar in Urban Problems, Political Socialization, American Presidency, Criminology, Urban Sociology, Introduction to Criminalistics, and Transportation Planning. Students use SPSS in a Research Methods course, and a new course is being introduced on "How to Use the Computer in Social Science."

RESEARCH INSTITUTE FOR SOCIO-TECHNICAL PROBLEMS

JSU's recent increase in faculty research is reflected in the establishment of this interdisciplinary research institute in 1980. Faculty from physical sciences, social sciences and journalism conduct research related to the Research Institute themes—family, energy, and environment. The University contributes computer services to the Institute's research activities.

Computer Literacy

If students and faculty are to benefit from computers in their learning, teaching, research and subsequent careers, they must acquire the basic skills and knowledge required to be informed users of the computer. These basic skills and knowledges related to using computers are often referred to as "computer literacy."

Students and faculty at JSU are assisted in their efforts to become computer literate, through a variety of means. These include short courses provided by the Computer Center, service courses offered by the Computer Science Department, academic departments requiring computer science courses for their majors, computer applications in courses in several departments, activities sponsored by the student ACM chapter and, of course, access to computer facilities.

The Computer Center staff offers short courses for faculty, staff and students on such subjects as SPSS, Introduction to Timesharing, COBOL Programming, Computer-Assisted Instruction. On request, special lectures are prepared and taught to a particular class.

In 1974, when JSU began operation of the regional educational computing network, workshops and non-credit courses were held for faculty. This activity established an important nucleus of computer-literate faculty, especially in the natural sciences.

The Computer Science Department offers courses not only for Computer Science majors, but for other students as well.

Many academic departments are requiring their majors to take computer science courses. These include:

- Accounting
- Business Education and Administrative Services
- Biology and pre-Medical
- Chemistry
- Economics
- Finance & General Business
- General Science
- Health
- Industrial Technology
- Management
- Marketing
- Mathematics
- Psychology
- Sociology

A formal Short Course series provides University credit to faculty, students, staff and administrators who take these courses. The Short Course series makes available to the University community the knowledge

and experience of visiting scientists and technologists. In 1979-80, several persons from Bell Laboratories taught short courses in:

- Operations Research
- Microprocessors and microcomputers
- Data Base Management Systems
- Operating Systems

Bell Laboratories also provided the microprocessors used in the microprocessor short course. The equipment will continue to be used in other computer science courses.

The Student chapter of the Association for Computing Machinery (ACM) sponsors activities that enhance computer literacy among the University community. They sponsor outside speakers for symposia, run a film series on computing, and volunteer to assist computer users in the data preparation room.

Another way in which Jackson State faculty increase their knowledge of computer applications to education is by participating in national workshops and conferences. For example, several JSU faculty participated in the 1979 Minority Institutions Curriculum Exchange Conference sponsored by the National Science Foundation.

Access to computing facilities is essential to the development of computer literacy. The increase in number of interactive terminals at locations convenient to faculty and students is a positive step in this direction.

Computer Science Program

Jackson State University is one of only three predominantly minority institutions in the country having a graduate degree program in Computer Science. The Master of Science program was authorized in 1974. By this time, the Department of Computer Science had already been established in the Division of Natural Sciences (1972), and an undergraduate degree program had been in operation for six years.

The Computer Science program began with an enrollment of five undergraduate majors in 1968. By 1979, there were 432 majors: 143 freshmen, 111 sophomores, 79 juniors, 57 seniors, and 42 graduate students. Of these, 368 were black, 19 white, and 45 other races. The size of enrollment makes Computer Science one of the largest departments in the Division of Natural Sciences at JSU. In addition, the Department serves students from many other disciplines who are required or encouraged by their departments to learn computer-related skills.

The success of Computer Science at JSU has been due largely to the efforts of a small nucleus of dedicated faculty, led by Dr. Lewis. Other factors contributing to this achievement have been the availability of computer facilities, supported in part by the National Science Foundation; and industry support in the form of visiting professors and employment opportunities for students and graduates.

FACULTY

One of the greatest challenges in establishing and maintaining a high-quality Computer Science Department is attracting and retaining qualified faculty, because of the great demand for such persons on the part of industry. JSU has addressed, and continues to address, this challenge in several ways. First, the founder of the Department, Dr. Lewis, established the computer facilities needed to attract experienced computer scientists. Second, faculty members were drawn from other Departments in the University, thus providing initial continuity and stability. Third, visiting faculty were and are provided by organizations such as IBM and Bell Laboratories. In addition, part-time faculty from industry and State government contribute knowledge of new developments in state-of-the-art, plus first-hand experience with a variety of real-world applications.

In 1980, major changes were made in the Department. Prior to this time, one person (Dr. Lewis) had served both as Chairman of the Computer Science Department and as Director of the Computer Center. With the rapid success and growth of both these organizations, JSU administration saw the need to provide full-time positions for both. In Computer Science, positions were established both for a new Chairperson and for five additional full-time faculty.

UNDERGRADUATE PROGRAM

The undergraduate program in Computer Science prepares students for graduate studies or for work in industry as systems programmers and scientific application programmers. The number of semester credits required for the B.S. degree is 134, of which a minimum of 39 are computer science courses.

Course offerings and requirements for undergraduate computer science are listed in Figure 4. Titles of sample senior projects give some indication of the diverse interests of computer science majors:

Sensor-based System
Macro Analysis in an IBM Environment
Real-time Programming System
ESS—Electronic Switching System
Organization and Structure of the PDP-11
Computer Power and Human Reason
Minicomputer Development With an Emphasis on System and Hardware Structure
Operating System Overview
A Description of Various Access Methods to the Computer
A Family and the Computer
Techniques of a Compiler
HIPO Documentation
Implementation of Data Encryption
The New Money: Promises and Pitfall of Electronic Funds Transfer
Computers in Education
Performance Optimization on the Series/1

The Computerized Society
The IBM: From Second to Third Generation
Computers in Society: Users and Misuses
Software Development
Computers and Crime
Data Base Management
Computer's Role in the Sports World
Microprocessors: New Dimension in Computering Systems
Panvalet Program Management and Security System
Computer Storage and New Memory Technologies
The PL/1 Programming Language

Computer Appreciation	Microprocessors (Planned)
Digital Computer Principles (R)*	Theory of Automata
Assembly Programming Language (R)	Non-numeric Applications
FORTRAN Programming Language (R)	Computer Science Seminar (R)
COBOL Programming Language (R)	Compiler Construction I (R)
PL/1 Programming Language (R)	Compiler Construction II (R)
BASIC Programming Language	Numerical Analysis I (R)
Programming Language	Numerical Analysis II (R)
Advanced Programming (R)	Applied Numerical Analysis
Introduction to Data Processing	Combinatorics
Logic	Linear Programming
Information Processing I (R)	System Simulation I (R)
Information Processing II	System Simulation II
Machine Organization I (R)	Operating Systems (Planned)
Machine Organization II	Graphics (Planned)

*(R) indicates courses required for majors.

Figure 4 – **Course Titles for Undergraduate Computer Science Courses Offered**

GRADUATE PROGRAM

The purpose of the interdisciplinary graduate program is to prepare students to participate in managements as modelers of real world decision processes and organizers of information.

At the M.S. level, the departmental philosophy is to have the student take the majority of his work in one of the special areas, namely, Management Science, Information Science, or Statistics. The number of semester credits required for the M.S. degree is 36. Course titles for Graduate Computer Science courses offered are shown as Figure 5.

Computer Appreciation
Computers and Programming
Introduction to Computer Systems and Organization
Computer Simulation Methods and Models
Numerical Methods for Digital Computers
Data Structures and File Management
Operating Systems
System Programming
Linear Algebra and Finite Mathematics
Business Data Processing and Information Management
Computers and Society
Special Topics in Computer Science
Probability and Statistical Inference I
Probability and Statistical Inference II
Statistical Methods for Research Workers
Regression and Forecasting Models
Multivariate Data Analysis
Advanced Topics in Statistics
Decision Models for Management
Theory of Organization and Group Behavior
Mathematical Programming and Optimization Models
Special Topics in Management Science
Project Research

Figure 5 – **Course Titles for Graduate Computer Science Courses Offered**

Titles of Master's theses indicate the interests of recent graduate students. Several of these have led to published articles.

1975 "Design and Implementation of an On-line Admission System" by Milton J. Boyer.

1976 "Computer Simulation of Hydrodynamics of DNA" by Stephen A. Quave.

"A Computer Application for Managerial Planning and Control" by Su Huei Liu.

"An Application of Statistical Methodology in the Study of a DOS/360 Interactive Terminal Facility" by Avis K. O'Neill.

1977 "An Application of Topological Sorting" by J. Nettles.

1978 "Application of Linked List Technique for the Enhancement of Traditional Random Access Files" by Tien-pao C. Wen.

1979 "Internal Sorting Methods and Comparison Illustrated with FORTRAN IV Programs" by Abbas. A. Shafiei-H.

"Concepts and Analysis of Data Base System" by Mottaleb-Azizi Kallehsar.

"Computer Solution of a Set of "n" Simultaneous Algebraic Linear Equations by Direct Methods" by Hassan Amiri.

"Design of a Text Editor for a Time Sharing Interactive System" by Ali A. Neyestani-J.

1980 "Design of an Interactive Computer Assisted Instruction Course in FORTRAN Computer Programming" by LeFlora Hankins.

Computer Resource Program

WORK-STUDY OPPORTUNITIES

The University provides the Computer Science Department with up to seven undergraduate work-study and two work-aid positions, and up to three graduate work-study and one assistantship position. This is a total of thirteen student assistant positions for the Department. These students provide assistance for the secretarial staff, faculty, operations, tutors, research, user services, tours, pre-recruitment for industries, and recruitment for future majors. Student assistants play an important role in the progress, elevation of standards and support of the Department.

Students are encouraged to participate in summer work-study jobs; about 20% participate in this cooperative program supported by industry.

Computer science students also find part-time employment and work experience by assisting in research projects in other Departments.

STUDENT CLUBS

There are two active clubs of special interest to computer science students—the campus Computer Club and the ACM Student Chapter. These student clubs play a role in promoting the general level of computer awareness on campus.

GRADUATE PLACEMENT

As of 1980, the University had awarded 140 B.S. degrees and about 17 M.S. degrees to Computer Science majors. The graduates are well received in industry and are among the highest paid graduates from JSU. About 80% of B.S. graduates have taken positions in industry as systems programmers, systems analysts, and liaison personnel between engineers and the computer. Leading employers have included IBM, Bell Laboratories, and Honeywell. Five to ten percent of the graduates have gone directly to other graduate schools.

PLANS

A PhD program in computer science has been designed and is under review by University administration.

Outreach

Jackson State University has served in a leadership role in Mississippi by providing computer facilities, training, and computer science education to faculty and students at universities, colleges and public schools in the region.

REGIONAL NETWORK

In 1974, JSU established and became the lead institution in a Regional Educational Computing Network for colleges in central Mississippi. Supported by grants from the National Science Foundation and contributions from participating institutions, this $1,264,000 project initiated faculty and students from twelve colleges and universities, as well as local high schools, into the era of academic computing. (Lewis, 1977)

According to Dr. Jesse Lewis, Principal Investigator for the project, the purpose of the Network is to provide appropriate equipment and educational effort "so as to allow each participating institution to become more aware of the academic implications of computers, with the ultimate goal of profoundly affecting basic curricula."

The Network provides timesharing terminals at each participating institution, connected to the JSU computer center. During the grant period from 1974-1977, the Network directly involved fifty-seven faculty members from thirteen disciplines in workshops, curriculum development, and integration of computer use into the classroom.

The original twelve participating institutions included both State-supported and private, two- and four-year, and both minority and non-minority institutions. Original institutions are listed in Figure 6.

When the grant period ended, several of the original institutions acquired their own equipment for academic computing. Others have continued and expanded their use of the JSU system. The current network serves schools in Mississippi and Tennessee:

Jackson State University
Hinds Junior College, MS
Utica Junior College, MS
Alcorn University, MS
Copiah Lincoln Junior College, MS
Mississippi Valley State University, MS

ORGANIZATIONAL RELATIONSHIP OF INSTITUTIONS

ETHNIC BACKGROUND OF INSTITUTIONS

BLACK	WHITE
Alcorn University	Copiah-Lincoln Jr. College
Jackson State University*	East Central Jr. College
Mississippi Ind. College	Hinds Junior Vollege
Mississippi Valley St. Univ.	Millsaps College
Rust College	Mississippi College
Tougaloo College	
Utica Junior College	

*Lead Institution

Figure 6 – **Original Network Participants**

Lane College, TN
Meridian Junior College, MS
Vicksburg High Schools, MS

COOPERATIVE COMPUTER SCIENCE PROGRAMS

In 1979, JSU established a cooperative computer science B.S. degree program with Lane College in Jackson, Tennessee. The program provides a coordinated curriculum in which students complete their first two years of study at Lane, and the last two years at JSU. A similar program was established with Meridian Junior College in Meridian, Mississippi.

WORKSHOP FOR MINORITY INSTITUTIONS

In 1980, JSU plans to organize and conduct a five-day workshop for representatives of twenty-three minority institutions. The purpose of the workshop is to help these institutions to make effective and efficient use of computers they have recently acquired with the aid of grants from the National Science Foundation's Minority Institutions Science Improvement Program (MISIP).

Other significant ways in which Jackson State extends its influence outward is through invited papers, lectures, consultations, and conferences presented by faculty, staff, and students. Examples include: Conference on Educational Computing in Minority Institutions 1976; 1976 Association for Computing Machinery and Special Interest Groups of Computer Science Education/Computer Uses in Education Joint Symposium; 1974 Cooperative Academic Planning Curriculum Development Workshop—(ISE) Institute for Services to Education, Inc.; and 1976 Association of Computing Machinery Special Interest Group on University Computing Centers (ACM-SIGUCC) Users Services Conference IV.

Numerous requests for program evaluations, consultations and lectures are made each year of the Computing Center Director. The following list of institutions are some of the consultation trips made across the country by the director over the past five years.

Tougaloo College, Tougaloo, MS
Nebraska Wesleyan University, Lincoln, NE

University of Arkansas-Pine Bluff, Pine Bluff, AR
Western Kentucky University, Bowling Green, KY
Bishop College, Dallas, TX
Tyler State College, Tyler, TX
Rockhurst College, Kansas City, MO
Indiana University, Bloomington, IN
Knoxville College, Knoxville, TN
Mercer University, Atlanta, GA
Coahoma Junior College, Clarksdale, MS
Tuskegee Institute, Tuskegee, AL
Talladega College, Talladega, AL
Texas Southern University, Houston, TX

Advice

How might administrators and faculty from similar institutions benefit from learning about the Jackson State experience? Dr. Jesse C. Lewis, Director of the Computer Center, has this to say:

> Seeking and gaining top administrative support is of the utmost importance in the development of Academic computing. In addition to providing the resources, administrative support of the person who has the interest and the know-how is very important. At times it may be necessary for administrators to support efforts and ideas that they do not technically understand. The return on investments in academic computing affect the total University.
>
> Attendance and participation in academic computing and related conferences can provide valuable information about software, hardware, and courseware.
>
> Free access to terminals for students and faculty enhance the use of the computer in instruction. Ease of access to terminals will attract many students (and faculty) who would not otherwise avail themselves to the advantages of the computer in learning, teaching and research.
>
> Faculty from other institutions may benefit by observing that many of our sophisticated faculty users started from scratch. Formal training is desirable, but the result of short non-credit courses and self study are amazing.
>
> It is clear to me that computers should be applied where they are needed most. I find it extremely significant that a large number of students from disadvantaged educational and cultural backgrounds now have contact with interactive computing. Beginning in the early 1970's, students in a number of minority institutions were given access to what may be one of the most valuable tools in education. In the future, computers will be involved in almost every phase of education, business and government. It is going to be necessary that almost everyone be familiar with them. Accreditation agencies should require that colleges and universities provide adequate computing facilities for their students.
>
> The value of the computer to the gifted student is yet to be realized. The computer may be just the educational tool required to provide the challenge needed to ensure that the minds of the gifted are developed to their fullest potential. The computer sparks the imagination and stretches the mind. It can be the difference between success and failure for both the gifted and the culturally and economically disadvantaged student.

Over the years, JSU has benefitted in many ways from having a large mainframe computer. However, Dr. Lewis stresses that today there are many less expensive alternatives, including mini- and microcomputers, that schools should consider when acquiring new equipment.

In reviewing the Jackson State case, one might note several factors that have contributed to success. First, the efforts of one or a few key persons dedicated to academic computing have been decisive. Second, the ability of the institution to attract grant support has been a major factor. Third, creative efforts have been made to attract qualified personnel. The obstacles to attracting and retaining computer science faculty and computer center staff are many and formidable. Industry and research laboratories can offer higher salaries and specialized facilities, and other universities are also competing for the few qualified individuals. While JSU has by no means "solved" this problem, it has aggressively sought partial solutions. Industry and government personnel are used as part-time and visiting faculty. These individuals enhance the Computer Science program with their knowledge of requirements of the workplace and industry trends.

A final lesson that administrators might note from the JSU case relates to the dynamic character of academic computing. As more and more faculty become involved and the state of the art changes, there are continuing increases in requirements for equipment, staff support, and software, and continual requirements for organizational change. JSU has in the past and continues in the present to modify its organization, staffing and facilities in response to these changing needs.

Contacts

The following list of individuals at Jackson State use the computer most regularly and may be contacted regarding their academic computing activities.

Name	Department
Barnes, Dr. Grover	Biology
Bhalla, Dr. Prem N.	Computer Science/Math
Bowlinger, Mr. Stephen F.	Psychology
Brewer, Dr. William	Industrial Technology
Brooking, Dr. Carl	Finance and General Business
Brookins, Ms. Mary A.	Computer Science/Math
Brookins, Dr. Geraldine	Psychology/Research Resource Ctr.
Chu, Dr. Ching-Shing	Computer Science
Crockett, Dr. Walter	Psychometric Services
Gills, Dr. Johnny	Mathematics
Johnson, Dr. Keith	General Science/Meterology
Lang, Dr. Marvel	Geography
Leggett, Dr. Earl	Education
Mack, Dr. Alley	Political Science
Myers, Dr. Lena W.	Sociology
Napier, Dr. Lee	Secondary Education
Rao, Dr. Prakash	Sociology
Straka, Dr. William C.	Physics
Sullivan, Dr. Richard	Chemistry
Venouss, Dr. Davar	Marketing
Weaver, Dr. Garrett	History

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5. Lewis, Jesse C. "A User Oriented Educational Computing Network." *Proceedings of the ACM Special Interest Group on University Computing Centers (SIGUCC) User Services Conference IV*, 1976.

6. Lewis, Jesse C. "Innovative Computer Services for Colleges." *Curriculum Change in Black Colleges VIII*, A Report on a Cooperative Academic Planning Curriculum Development Workshop, 1974.

7. McLemore, Leslie B. "Interim Report to Minority Institutions Science Improvement Program, Grant No. SER77-16625," 1979.

8. Smith, Charlie J. "Jackson State University College Science Improvement Program," Final Report. August 1976.

9. Wodetzki, Margaret. "Progress Report on PLATO Project." Department of Chemistry, Jackson State University, July 1, 1979.

APPENDIX:

SELECTION OF CASES

Selection of Cases

Case Institutions were selected through a four-stage procedure. First, we conducted a systematic search for institutions that are regarded as outstanding in their uses of computers for learning and teaching. Invitations were mailed to seven thousand educators and technologists who belong to professional organizations concerned with educational computing. These individuals were invited to nominate one or more educational institutions that they regard as outstanding. Nominators were asked to give specific reasons why the school should be considered, given the objectives of our study.

Over 500 individuals responded, nominating 370 institutions that met our criteria.[1] Eligible institutions included individual elementary and secondary schools, public school districts, community colleges, colleges, and universities, and public access institutions such as museums.

Second, we contacted at each nominated institution, an individual who has a purview of instructional computing activities (Director of the Computing Center or a Coordinator of Instructional Computing). The nominated institutions were happy to participate, and provided information about their activities via a telephone interview with a member of our staff. The product of this stage is an Academic Computing Directory, published by HumRRO, that gives brief information on the reasons for nomination, enrollment, typical computer applications, make and model of main computer(s), number of terminals on campus, and persons to contact.

Third, nominees were invited to respond to one or more of a series of open-ended questionnaires corresponding to the following Categories of Excellence:

1. Institutional Commitment to Instructional Computing
2. Student Accomplishments
3. Institution Productivity
4. Spectrum of Applications
5. Computer Literacy
6. Computer Science and/or Data Processing Programs
7. Outreach
8. Model

[1] Projects, consortia, timesharing companies were not eligible.

These questionnaires were quite lengthy and required considerable work on the part of the respondents. By completing one or more of the questionnaires, the respondents demonstrated their willingness and ability to share information. Over one hundred of the nominees responded in one or more categories of excellence. HumRRO staff then reviewed all candidate institutions within each Category of Excellence. We selected as Exemplars in each Category those institutions that had provided complete answers and had demonstrated a high commitment to instructional computing. Consulting experts were called upon to review candidates in specific Categories. The product of this third stage is a list of Exemplary Institutions distributed by HumRRO.

Fourth, Case Institutions were selected from among the Exemplars. The following criterion dimensions were used in selection:

1. High institution commitment to academic computing as demonstrated by the survival of instructional computing over several budget cycles; staff support for instructional computing; reform of curriculum to incorporate computer uses; increases in appropriate computing equipment; incentives to faculty for instructional innovation.
2. High degree of computer literacy among students, faculty and administration, as reflected in student accomplishments, spectrum of applications, and number of computer users on campus.
3. Appropriate response to the Model questionnaire, and usefulness of all questionnaire responses.

The following educational institutions were selected to participate as Case Studies in Academic Computing:

United States Naval Academy, Annapolis, Maryland
*Worcester Polytechnic Institute, Worcester, Massachusetts
*Denison University, Granville, Ohio
Evergreen State College, Olympia, Washington
*Jackson State University, Jackson, Mississippi
*Mankato State University, Mankato, Minnesota
*Rutgers, The State University, Piscataway, New Jersey
University of Delaware, Newark, Delaware
University of Texas, Austin, Texas

*Case Study books have been prepared for only the asterisked institutions.

*North Salem High School, Salem, Oregon
*George Washington High School, Denver, Colorado
*Lincoln High School, Bloomington, Minnesota
*Ridgewood High School, Ridgewood, New Jersey
*Riverdale Country School, Bronx, New York
*Huntington Beach Union High School District, Huntington Beach, California
*Alexis I. DuPont School District, Greenville, Delaware
*Chicago Public Schools, Chicago, Illinois
*Dallas Independent School District, Dallas, Texas
*Lawrence Hall of Science, Berkeley, California
William Rainery Harper Community College, Palatine, Illinois
Golden West Community College, Huntington Beach, California

*Case Study books have been prepared for only the asterisked institutions.